Optimizing Sepsis Management Through Enhanced Protocol Compliance in the Emergency Department

Teela Sade Miller-Buford
University of San Francisco, tsmillerbuford@usfca.edu

Follow this and additional works at: https://repository.usfca.edu/capstone

Part of the Other Nursing Commons, and the Quality Improvement Commons

Recommended Citation
https://repository.usfca.edu/capstone/1652

This Project/Capstone - Global access is brought to you for free and open access by the All Theses, Dissertations, Capstones and Projects at USF Scholarship: a digital repository @ Gleeson Library | Geschke Center. It has been accepted for inclusion in Master's Projects and Capstones by an authorized administrator of USF Scholarship: a digital repository @ Gleeson Library | Geschke Center. For more information, please contact repository@usfca.edu.
Optimizing Sepsis Management Through Enhanced Protocol Compliance in the
Emergency Department

Teela Miller-Buford, RN

School of Nursing and Health Professions, University of San Francisco

NURSS653-01: Internship

Nneka Chukwu, DNP-HCSL, MBA, CLNC, CNL

December 10, 2023
### Table of Contents

**Section I: Abstract**

**Section II: Introduction**
- Problem Description .......................................................... 8
- PICOT Question ........................................................................ 8
- Rationale .................................................................................. 8
- Search Strategy ......................................................................... 9
- Available Knowledge ............................................................... 9
- Specific Project Aim ............................................................... 13

**Section III: Methods**
- Project Overview ...................................................................... 13
- Microsystem Assessment .......................................................... 14
- Plan, Do, Study, Act (PDSA) Cycle ........................................ 15
- Root Cause Analysis (RCA) ...................................................... 16
- Strength, Weaknesses, Opportunities, Threats (SWOT) Analysis ........................................ 16
- Cost-Benefit Analysis (CBA) ..................................................... 17
- Timeline .................................................................................... 17
- Intervention .............................................................................. 17
- Study of Interventions ............................................................ 18
- Measures .................................................................................. 19
- Ethical Considerations ........................................................... 19

**Section IV: Results**................................................................. 19
Abstract

**Problem:** This quality improvement project aims to enhance early sepsis management and sepsis bundle compliance among Emergency Department nurses to reduce the risk of sepsis-related deaths and hospital length of stays.

**Context:** A group of students studying to become Clinical Nurse Leaders (CNLs) evaluated Hospital A's Emergency Department (a clinical microsystem) located in the greater Bay Area. This microsystem provides diverse emergency care for patients with various medical conditions and diagnoses. The CNL students concentrated on patients diagnosed with sepsis for their quality improvement project.

**Interventions:** Although time constraints prevented the implementation of interventions, the CNL students proposed recommendations to the leadership team for follow-up. Recommendations for interventions centered on improving interprofessional education and training regarding overall sepsis management. In addition to establishing a comprehensive sepsis protocol to standardize sepsis management in the Emergency Department.

**Measures:** After assessing the microsystem, CNL students collected data to evaluate the nurses' knowledge of the sepsis bundle and Hospital A’s sepsis policy. The data also served to identify any barriers nurses experienced while implementing the bundle, along with any complications that arose during treatment. A post-intervention survey could not be performed due to time constraints.

**Results:** In the survey questionnaire, 41 nurses participated, resulting in a 36% response rate. Key findings showed that 31% of the nurses would like to see a revision to the sepsis policy. Additionally, 61% of the nurses reported receiving no debriefing counsel when compliance measures were unmet. Also, 70% of the nurse's escalation processes did not follow the chain of
command. 26.8% of identified barriers were difficulties establishing intravenous access. 33.8% of nurses cited poor staffing, training, and nursing experience as additional barriers. Meanwhile, 80% of the nurses acknowledged the sepsis treatment timeline.

Conclusions: The results of the pre-intervention survey questionnaire suggest that standardization is missing in sepsis management. The hope is that with the ongoing progress of this project, which includes increasing educational measures and accessible resources, the sepsis bundle will be deployed and utilized efficiently. Ultimately, this will help to improve sepsis mortality and morbidity occurrences.

Keywords: Emergency Department, sepsis bundle, ultrasound, early sepsis management, sepsis education, and standardizing care.
Introduction

The emergency department (ED) got a call from the paramedics at 00:00. The paramedics told an ED staff that they had a patient en route and would arrive within seven minutes. Based on the paramedic's assessment, the patient appeared to be a homeless middle-aged male found by bystanders in a disheveled and senile state. Vital signs obtained from paramedics were borderline; blood pressure was low, his temperature was 99.7, and the patient was on five liters of oxygen. The patient arrived at 00:10 tachypneic with a temperature of 100.8. Sepsis alert is announced overhead. The ED physician ordered a sepsis workup for the patient at the time of his arrival. The patient's nurse expeditiously removed his clothing, exchanging it for a hospital gown. She then placed the patient on a cardiac monitor and a pulse oximeter and inserted a urinary catheter for urine collection. A chest x-ray result revealed that the patient had pneumonia. The on-shift phlebotomist arrived five minutes after the sepsis alert to collect labs, including venous blood gas (VBG) with lactate. The phlebotomist informed the nurse that both sets of blood cultures had a collection time of 00:26 and 00:31. As the results were pending for the VBG, the nurse went on break. She failed to endorse to the relief nurse that both sets of cultures were completed for antibiotic administration. The VGB result was a highly elevated level of 2.9. It is now 01:45, and the patient's vitals are producing drastically low readings. The only intervention the patient has received thus far is a half-liter bolus of normal saline and 1000 mg of Tylenol. The patient finally receives antibiotics and an additional 1-liter bolus of normal saline. Unfortunately, the interventions provide no benefit to the patient at this point. He is showing signs of multiple organ failure. The physician decides to intubate the patient until stabilization occurs. Sadly, the patient died almost two hours after his arrival. This was a personal story experienced by the author of this paper.
Every year, the United States reports almost 2 million cases of sepsis, leading to approximately 300,000 deaths. Healthcare providers are treating more sepsis instances (National Institute of General Medical Sciences [NIGMS], 2021). While studying the work of Kim et al. (2018), it was revealed that sepsis is ranked number 11 as the leading cause of death in the United States, including the leading cause of death in noncardiac intensive care units (ICUs). When dealing with patients experiencing a stroke or a myocardial infarction, medical professionals stress the importance of time, with the philosophy of "Time is brain and muscle." Similarly, time is of the utmost importance for septic patients. Thus, early identification and management of sepsis is crucial in achieving positive patient outcomes.

Delaying sepsis treatment or failing to utilize all sepsis bundle components increases the risk of a patient developing septic shock, which can lead to organ failure. If organ system(s) failure occurs, death for the patient becomes inevitable. Sepsis treatment measures often include a VGB with lactate, blood cultures, administering fluids and antibiotics, and vasopressors if septic-induced hypotension occurs (Levy et al., 2018). Consideration of the patient's heart rate before vasopressor infusion is important. The Surviving Sepsis Campaign (SSC) is a joint effort between the Society of Critical Care Medicine (SCCM) and the European Society of Intensive Care Medicine (ESICM). Emergency departments rely on their collaboration to assist them with sepsis cases. SCC has made valuable recommendations for sepsis treatment, resulting in lower mortality rates and better patient outcomes post-septic state. Recommendations include administering fluids and antibiotics within the first hour of identifying sepsis, also known as "The one-hour bundle." This approach originated from the three and six-hour bundles (Levy et al., 2018). There may be scenarios where emergency personnel cannot execute all components of a sepsis bundle. There may also be delays in implementing treatment. Regardless of the cause,
time is critical when executing a sepsis bundle. Therefore, it is essential to make necessary adjustments to ensure the timely execution of bundled care and compliance with bundle components.

**Problem description**

Hospital A is a level II adult trauma hospital with 554 beds in the greater Bay Area. Moreover, the ED has over 100 highly skilled nurses and 44 treatment rooms fully equipped and ready for patient care. With a recent influx of sepsis cases, nursing staff have been facing challenges with early sepsis management or complying with sepsis bundle guidelines. Stakeholders identified gaps in sepsis case management. Some patients received interventions within the first hour of sepsis identification. In contrast, the sepsis bundle was implemented late, or only some of the components within the bundle were completed for other patients. To address these gaps, a Quality Improvement (QI) project was conducted by CNL students to investigate identified gaps and to make recommendations on improving ED sepsis management and sepsis bundle compliance.

**PICOT Question**

As part of this QI project, a Patient, Intervention, Comparison, Outcome, and Time (PICOT) question was devised to determine the effectiveness of the project. The PICOT question is: Does providing nursing staff support, accountability, and ongoing education enhance the timely implementation of sepsis bundle and compliance compared to current practices in the emergency department within four months?

**Rationale**
The Prosci Awareness, Desire, Knowledge, Ability, Reinforcement (ADKAR) model theory was adopted by the CNL students to facilitate change in the microsystem. Leaders recognize this model because of the positive outcomes microsystems have achieved. Leaders have reported better communication and staff training during their changing phase (Balluck et al., 2020). The leadership team, as well as the nurses, are aware and understand that changes need to occur with sepsis management and sepsis bundle compliance to provide efficient care to patients. The responses from the questionnaire survey expressed the nursing staff’s desire to change the current sepsis care standard. The students presented evidence-based recommendations to the Leadership team to satisfy the “knowledge” piece of ADKAR. From the changes, nurses will have the increased ability to efficiently take care of their patients from their refined training, education, and advancement in their critical thinking skills. Reinforcement is a way to monitor changes over time to ensure desired outcomes have been met. Encouraging changes through positive feedback and recognition will motivate the staff to keep the process going. Addressing any actions of old behaviors is another way to reinforce and maintain changes.

Search Strategy

The search strategy consisted of a literature review with a time frame of one month (September-October of 2023). Multiple databases like PubMed, Scopus, CINAHL, and MEDLINE were accessed throughout the search. To find specific information, inclusion criteria of terms such as Emergency Department, sepsis bundle, ultrasound, early sepsis management, sepsis education, and standardizing care.

Available knowledge
To support this study, an inclusive literature review was conducted on evidence-based practices for standardizing sepsis care, early sepsis management, and using Technology for intravenous placement. The quality of evidence within the articles was evaluated using the John Hopkins Evidence-Based Practice model and guidelines for nurses and healthcare professionals (see Appendix B) (Dang et al., 2022). The literature amalgamation for this study is pertinent because they all provide strong evidence of positive patient outcomes when sepsis management is implemented early. Also, the studies suggested improvements in nursing processes when nursing staff receives adequate education on sepsis treatment, with immediate follow-ups of delayed cases—(a Sepsis Champion should be assigned to assist with the nurse's sepsis educational goal). The literature synthesis also emphasized that improving nurse skills with intravenous placement (IVP) will improve patient outcomes.

Sepsis care in most EDs is nurse-driven, meaning nurses do not wait for the attending physician to order a sepsis work-up. Ferguson et al. (2019) retrospective cohort study suggests that nurse-driven sepsis care has improved bundle adherence and reduced sepsis-related mortality rates in hospitals. During their research, ED nurses took an average of 80 minutes to administer antibiotics after triage while also achieving a significant increase of 70% in bundle compliance. There was also a reduction in calls to the Rapid Response Team (RRT) down to 1%. Furthermore, there was a decrease in the number of hospital sepsis-related deaths, resulting in an overall reduction of 4.5 deaths per 100 sepsis-related discharges. Adopting a standardized approach that is specific to the type of care being offered provides guidelines for nursing staff when managing sepsis. A systematic literature review that included 24 studies of longitudinal repeated measures was conducted by Sungkar et al. in 2018. Though the evidence of this review is at level three, the implementation of a sepsis bundle resulted in a decrease in the time of
antibiotic administration. This led to significant improvement in all septic cases. The lactate blood draws increased from 46% to 100% (Sungkar et al., 2018). The SSC bundle has been used to treat sepsis, and many studies have shown its effectiveness. According to the guidelines from the SSC, the sepsis care bundle includes a VBG and two sets of blood cultures (and other labs such as complete blood count (CBC), comprehensive metabolic panel (CMP), and coagulation studies). If the initial result of the test is greater than 2mmol/L, the patient is considered septic, as per Levy et al.'s 2018 study. Repeated VBG tests with lactate will be conducted over the course of four hours from the time of the initial test, and blood cultures will be collected along with the VBG. Although sepsis treatment requires two sets of blood cultures before administering antibiotics, Levy et al. (2018) recommend that antibiotic therapy should not be delayed if both blood cultures cannot be obtained. Intravenous fluids and antibiotics are included in the bundled care (Levy et al., 2018). During a ten-month quality improvement project in a 38-bed short-stay department of an 800-bed hospital in New York City, the goal was to provide timely sepsis care by implementing 2018 SSC one-hour interventions. The study found that sepsis care was initiated within the first hour of identification due to improved sepsis knowledge, increased staffing, and better intravenous access equipment (Gripp et al., 2020).

An impactful prospective randomized control trial (RCT) study designed by Bahl et al. (2016) demonstrated that the use of ultrasound technology during IVP led to a significant improvement in success rates for IVP in the ED. The study included 122 patients and showed a success rate of 76% when IVP was assisted with an ultrasound. This data suggests that nurses should be trained in using ultrasound for IVP, as this may decrease delays in patient care, i.e., bundled care (Bahl et al., 2016). IVP is an essential component as most of the bundled care is
administered through the patient's IV access point. Without intravenous access, patients cannot receive anticipated resuscitation needs.

Gripp et al., 2020 and Im et al., 2022 concur with the notion that the cornerstone for effective sepsis management is early implementation—prompt fluid resuscitation, which is elemental for optimal patient outcomes. The SCC guidelines advise that crystalloid fluids should be given 30 mL/kg at minimum (Levy et al., 2018). Fluid administration aims to increase or maintain perfusion and correct hypotension (if present). This outcome can be achieved effectively if the team establishes an IV access within the first hour of their care. Conversely, a systematic review, meta-analysis, and narrative review accessing many databases searching for applicable studies were conducted by Kabil et al. (2022) to investigate measures to improve compliance with early fluid administration and explore non-interventional measures and barriers affecting fluid resuscitation efforts. In the meta-analysis study, the interventions were linked with a 47% improvement in the compliance rate.

In contrast, in the narrative synthesis, the compliance rate of early fluid administration was parallel with an average time reduction of 24 minutes. Identified barriers like patients' age, comorbidities, or shock contributed to poor sepsis bundle compliance in the ED. While there may be barriers to fluid resuscitation, such as the patient's age, comorbidities, or shock, these should not hinder sepsis management (Kabil et al., 2022). Two Prospective Cohort Studies were reviewed. Im et al. (2022) examined 3,035 patients from 19 different emergency rooms. It revealed that administrating antibiotics reverses sepsis and reduces the risk of septic shock, especially within the first hour. Unfortunately, patients who received antibiotics beyond three hours showed increased mortality risks.
Im et al. (2022) and Gripp et al. (2020) reported that re-huddles were utilized to assess treatment progress, and sepsis champions provided educational debriefings to the treating team within a week of a delayed sepsis case treatment. Rabata et al. (2022) conducted a study on educational programs with simulated learning and found that they improved nurses' knowledge, attitude, practice, and decision-making regarding sepsis management. The study also found that educational programs helped nurses complete their tasks despite any barriers they faced.

**Specific Project Aim**

This quality improvement project aims to enhance the compliance rate for the sepsis bundle and its utilization in the Emergency Department of a level II adult trauma hospital within the greater Bay Area. The process began with administering a survey questionnaire to help the nursing staff identify barriers to sepsis bundle compliance. The process will conclude with a presentation of recommendations of evidence-based practices on methodologies that will increase compliance and utilization of the bundle by 60%. It is essential to address this issue now, as sepsis is still considered a leading cause of hospital-related deaths and significant financial burdens. By working on this project, the CNL students anticipate improving the current bundle compliance rate, leading to increased timely sepsis management, reducing hospital length-of-stay, decreasing the risk of sepsis-related mortality, and decreasing readmission rates among this population.

**Methods**

**Project Overview**

The Plan, Do, Study, Act (PDSA) cycle (see Appendix C) was employed to facilitate this QI project. The CNL students created a PICOT question and specific aim statement using the
data provided by Hospital A. An extensive literature review was conducted, referencing sepsis management and bundled care. The 5 P Assessment tool and Root Cause Analysis (RCA) were utilized to assess the microsystem effectively (Appendix D). Also, the students completed a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis (Appendix E). Data collection and analysis consisted of a pre-intervention questionnaire that is available in Appendix F. The team provided evidence-based recommendations to the leaders at Hospital A based on the results of the data collected from the ED Nurses. Additionally, the students created a Cost-Benefit Analysis (CBA) to demonstrate potential cost savings, (Appendix G). To demonstrate the project timeline, a Gantt Chart was created (Appendix H).

**Microsystem Assessment**

For the CNL students to assess the microsystem’s workflow and performance, the 5 Ps were used. The 5 Ps consist of purpose, patients, professionals, processes, and patterns. This analysis aims to improve early sepsis management and compliance with bundled care. Improving this area of the study would then lead to improving patient outcomes and the nursing process regarding sepsis management. Patients diagnosed with sepsis were the sole cases observed. Some patients had comorbidities like congestive heart failure (CHF) or end-stage renal disease (ESRD), which were considered while managing their sepsis. For example, a patient with fluid restrictions would need to have their fluid administration modified, or antibiotics had to be administered cautiously to prevent a patient's preexisting kidney condition from worsening. An interdisciplinary team comprising registered nurses, physicians, phlebotomists, respiratory therapists, X-ray technicians, laboratory staff, registration clerks, and a rapid response team (RRT) collaborated. ED nurses need to undergo annual sepsis training as part of their job
responsibilities. They are expected to conduct nursing assessments, which involve screening patients for Systemic Inflammatory Response Syndrome (SIRS) and Sequential Organ Failure (SOFA), documenting electronic Cardiac Arrest Risk Triage (eCART), and following the sepsis bundle policy. These tasks ensure that septic patients receive prompt and efficient care. Shift huddles, effective communication among the team, shift handoff reporting, and charting in the patient's electronic health record (EHR) were identified as the patterns in the microsystem.

**Plan, Do, Study, Act (PDSA) Cycle**

The planning process is the first phase of the PDSA cycle. CNL students collaborated with Hospital A's leadership team to identify gaps in the ED's sepsis management and bundle compliance and the cause of “patient fallouts.” The PICOT question and specific aim statement guided the proposal for this quality improvement initiative and establishment of a sepsis management and bundle compliance questionnaire. During the "Do" phase of the PDSA cycle, the implementation process was carried out for five weeks. The 5 P assessment tool was used to conduct an RCA to identify any issues related to sepsis management and compliance with bundle care. A passive questionnaire survey was administered to the ED nurses for data collection. In the study phase, the CNL students reviewed and synthesized data from the pre-intervention questionnaire to design recommendations. The final stage of the PDSA cycle was concluded with a set of recommendations using evidence-based guidelines. These recommendations suggested ways to improve early sepsis management and bundled care compliance. The students provided the leadership team with prospective suggestions regarding the steps. Although time constraints prevented the initiation of the proposed recommendations, the CNL students are optimistic that the study will be executed in the future, allowing an opportunity for a post-intervention review.
Root Cause Analysis (RCA)

Hospital A is a level II adult trauma center located in the greater Bay Area, with 554 beds. The hospital’s Emergency Department has over 100 highly skilled nurses and 44 treatment rooms, making it fully prepared to provide optimal patient care. However, Stakeholders identified gaps in sepsis case management. The nursing staff has been facing challenges with early sepsis management and adhering to sepsis bundle guidelines due to a recent surge in sepsis cases. An RCA was performed to help identify gaps in sepsis case management. The nurses identified various factors that led to non-compliance or delayed sepsis management. Patients sometimes had poor venous access, which hindered the establishment of IV access or caused delays in blood collection and results. Not having a sepsis champion available was also identified as an issue in relation to sepsis management. Nurses explained that, at times, missing orders from the attending physician, variations in the chain of command, and insufficient staff during a shift negatively affected their ability to provide adequate support to patients. Nurses also mentioned that a shortage of treatment beds caused further care delays. Discrepancies were discovered with the frequency of sepsis education. The escalation process and the current sepsis policy ED nurses rely on were also flagged as barriers.

Strengths, Weaknesses, Opportunities, Threats (SWOT) Analysis

Using a SWOT analysis provided the CNL students with Hospital A’s current state of sepsis bundle compliance. A noted strength was the ED nursing staff’s access to a sepsis protocol and receiving annual sepsis education. Hospital A’s strengths may also be a weakness due to deficits between collaboration and standardizing care measures. The weaknesses identified included a sepsis protocol that is not specific to the ED, discrepancies about annual training, and
a need for improvement with IV access. To enhance nursing processes and patient outcomes, the students recommended developing a comprehensive sepsis policy to standardize sepsis management better, increase sepsis bundle compliance, strengthen nursing skills with IVP, and provide more sepsis education to improve nurses’ critical thinking skills. Implementation of these measures will decrease patients' length of hospital stay. Potential threats consist of costs and time needed for training, education, and sepsis resources.

**Cost-Benefits Analysis (CBA)**

A CBA was computed to help CNL students assess the potential benefits of the recommendations and potentiated costs of proposed sepsis improvement approaches. The estimated annual total budget to purchase sepsis buddy badge cards imprinted with the ED sepsis policy and escalation processes, ultrasound-guided IV training, and sepsis bundle training twice a year (once every six months) was compared to a decrease in one sepsis-related complication occurrence in the ED on a monthly basis (Paoli et al., 2018).

**Timeline**

The development of a Gantt Chart provided a time management tool for this QI project. Objectives from the Plan-Do-Study-Act (PDSA) cycle, which took place from September 2023 to November 2023, were utilized throughout the project.

**Intervention**

Interventions were not implemented due to time constraints. However, based on the questionnaire responses, evidence-based recommendations will be provided to guide the project towards completion. The project's main objective was to gain a clearer insight into Hospital A's
present state of sepsis management in their ED. Passive and active data were collected using SWOT analysis, 5P assessment, and questionnaire survey. Each participant was gifted an edible incentive. The survey responses provided valuable feedback about nurses' sepsis protocol knowledge, their sepsis education, experienced barriers to treatment, and recommendations for improvements. Data from the survey was evaluated using the RCA and CBA. Please see Appendix F for a copy of the questionnaire.

The remaining steps for this project are the recommendations. Advised interventions include standardizing and increasing sepsis training frequency and refining technology-assisted intravenous (IV) placement skills. Other potential recommendations are developing post-training evaluations to solicit feedback and case reviews on near misses. More suggestions consist of creating a comprehensive sepsis screening policy, designing “badge buddies” cards with visual aids detailing sepsis guidelines, standardizing the escalation pathway, and lastly, incorporating an automated warning/clinical decision support system into EPIC. These interventions will be implemented, followed by evaluating the project's overall outcomes.

**Study of Intervention**

Upon implementing the proposed recommendations, the microsystem should see an improvement in sepsis management, nursing processes, and patient outcomes. Nurses will employ the sepsis bundle within the first hour. There will also be a minimization with variations in sepsis management. Nurses will see advancement in their critical thinking skills due to updates in their sepsis education and training as well. A post-intervention survey will be conducted to measure the success of the project. If ideal results are not met, leadership is encouraged to perform another PDSA cycle with new recommendations.
Measures

The questionnaire comprised nine open-ended qualitative questions (Appendix F). Most questions related to nurses' understanding of standard sepsis management, timeline, prioritization measures, training opportunities, and any policy disquiets. Other questions focused on any current barriers affecting bundled care timelines, escalation processes for questions or concerns, and debriefing processes for non-compliance. All participants' responses were namelessly recorded.

Ethical Considerations

This project conforms to evidence-based quality improvement guidelines but does not meet institutional review board approval criteria. The project also aligns with the fourth Provision Section 1 of the ANA COE. Nurses have the authority, accountability, and responsibility to provide optimal patient care through nursing practice, decision-making, and action-taking (American Nurse Association [ANA], 2015).

Results

The survey had nine open-ended questions. The first two questions inquired about the knowledge and prioritization of the sepsis bundle. Most of the nurses (80.5%) responded that they prioritize the early implementation of the bundle, also called the "Golden Hour." Question three aimed to identify any obstacles that hindered the implementation of timely treatment. About 26.8% of the recorded answers revealed difficulties obtaining IV access. Meanwhile, 33.8% reported a shortage of staffing and nursing experience in the emergency department as a significant barrier. Additionally, delayed orders from attending physicians, high patient volume,
and lack of triage experience were collectively reported as other barriers, accounting for 36.7% of the responses.

Question four focused on escalation processes regarding sepsis treatment protocol. This question highlighted that some nurses did not use or were unaware of the chain of command. Around 70% of respondents stated they contacted the attending physician or other professionals like pharmacists, educators, and managers. Alternatively, 29.3% of the respondents concluded that they would speak with the charge nurse as part of their escalation process. The fifth question inquired about debriefing measures. Of the respondents, 61% answered none, while 39.1% reported that leadership's debriefing measures consisted of chart auditing, follow-up with leadership, or email communication.

Question six pertained to the frequency of sepsis training. 70% of nurses reported receiving annual training, and 30% of respondents said never or rarely. Questions seven and eight responses yielded that 95% of the nurses believe that sepsis management is nurse-driven and they do not wait for doctors' orders. The last question allowed nurses to share their feelings about the sepsis protocol. About 31.1% of the nurses wanted to see revisions made to the current protocol, 14.1% wanted to see changes in staffing, and 28.9% wanted to see an update in training and education.

Discussion

A key finding from this project is that Hospital A’s emergency department nursing staff have been doing their best to provide care to septic patients with their skills and available resources. The project aims to enhance the compliance rate for the sepsis bundle and its early utilization. Lessons learned from the methods would be the importance of having standards in all
aspects of care. Nurses’ education and training should also be standardized and proficient in order for nurses to deliver competent and safe care. Having standards ensures that staff have support, guidance, and leadership to hold their staff accountable and that patients get the care they deserve. The participation of the nursing staff contributed to the anticipated changes, and it also strengthened the project. The nurses were able to pinpoint the exact issues surrounding their ability to provide patient care. The identified issues discussed in the project can be rectified. The recommended changes were strategically discussed and analyzed using SWOT analysis and CBA. The CNL students are hopeful that the leadership team will reach the intended success of the project in the future.

Limitations

There were limitations to this quality improvement process. For example, only 41 out of the 115 ED nurses (excluding four nurses who were unavailable at the time of the data survey questionnaire) participated in this project for a response rate of 36%. However, all the nurses are responsible for adhering to the sepsis policy. Also, there was a slight delay in retrieving internal data from the microsystem. The CNL students could not access the Nurses’ education learning platform or the annual educational learning effectiveness since it was noted for revision by the survey participants. Nonetheless, the leadership team was presented with prospective interventions with an analysis of the survey results.

Summary

The nursing leadership team at Hospital A identified issues with sepsis management in the Emergency Department. As a result, CNL students thoroughly investigated barriers that interfered with the care of septic patients. An assessment of this microsystem was performed
using quality improvement tools. The students developed a PICOT question and a self-administered questionnaire to provide further insight into the microsystem's sepsis training, education, and policy. A PDSA cycle and proposed recommendations regarding sepsis management and bundle compliance were given to support the leadership team with needed changes. Data obtained showed that 31.1% of nurses want to see a revision in the current sepsis policy, 70% reported receiving annual training, and 70% stated that their escalation process was to the attending physician or other healthcare professionals and not the charge nurse. These responses highlighted inconsistencies in practice, education, and training.

**Conclusion**

The successful collaboration between the CNL students, Hospital A's leadership team, and ED nurses proved invaluable in identifying gaps in nursing processes and barriers that hinder the delivery of care to patients. The QI project focused on improving nursing processes for early sepsis bundle implementation and compliance, with the ultimate goal of enhancing patient outcomes concerning decreasing morbidity and mortality rates related to sepsis management. This study underscores the significance of standardizing early sepsis management. It also emphasizes the need for medical professionals to remain current on their education and continuously hone their skills to combat the ever-changing sepsis effectively. Furthermore, Hospital A's leadership team must prioritize maintaining standards and holding their nursing staff accountable to minimize variations as much as possible. For the identified barriers, the leadership team has been given prospective evidence-based recommendations to help with the early management of sepsis and bundle compliance. Besides standardizing care and nursing
processes, continued collaboration and communication are other aspects of sepsis management that will enhance prompt initiation of treatment and compliance and better patient outcomes.
References


Bolus in adults with sepsis in the emergency department: A systematic review, meta-analysis and narrative synthesis. BMC Emergency Medicine, 22(1).

https://doi.org/10.1186/s12873-02100558-5


https://doi.org/10.1097/ccm.0000000000003342


https://doi.org/10.1016/j.nedt.2022.105270


Appendix A

Self Determination form

Student Project Approval: Statement of Determination

Title of Project:
Sepsis Management: Enhancing Protocol Compliance in the Emergency Room

Brief Description of Project:
The aim of this quality improvement project is to improve early sepsis management and sepsis bundle compliance to reduce sepsis-related morbidity and/or mortality rates in the emergency department at Hospital A. Data collected from a pre-intervention questionnaire will reveal any gaps in knowledge or barriers hindering early sepsis management and bundle compliance.

Recommendations that were formulated from current evidence-based practices and the survey responses will be presented to the nursing leadership team for implementation.

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used:(http://answers.hhs.gov/ohrp/categories/1_569)

This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Students may proceed with implementation.

Comments:

Signature of Supervisor

Signature of Student

(date) 11/30/23

(date) 12/4/2023
# Appendix B

**Literature Synthesis Table**

<table>
<thead>
<tr>
<th>Study Authors</th>
<th>Objective &amp; design</th>
<th>Sample &amp; Setting</th>
<th>Results</th>
<th>Level of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahl, A., Pandurangadu, A. V., Tucker, J., &amp; Bagan, M.</td>
<td>Randomized prospective single-site study to analyze outcomes associated with ultrasound-guided intravenous placement by nurses, compared to standard intravenous access, for patients with poor vascular access.</td>
<td>A total of 124 participants, 63 of whom were randomized to the US-guided arm. Originally, 61 participants were randomized into the SOC arm, but 2 patients were excluded leaving 59 in the second group.</td>
<td>There was a 76% success rate for the US-guided arm and 56% for the SOC arm.</td>
<td>Level II (Dang et al., 2022)</td>
</tr>
<tr>
<td>Gripp L., L., Raffoul M., &amp; Milner K.A., (2021)</td>
<td>Ten-month prospective quality improvement project with an aim to enhance the prompt management of sepsis by executing the one-hour interventions recommended by the 2018 Surviving Sepsis Campaign.</td>
<td>A 38-bed short-stay unit within an 800-bed hospital in New York City.</td>
<td>From May 6, 2019 to October 1, 2019, 32 patients were diagnosed with sepsis. It was shown that initial lactate and blood cultures were completed on every patient within one-hour of sepsis diagnosis. Antibiotics were administered within one-hour, reached 100% after week four, and were sustained.</td>
<td>Level II (Dang et al., 2021)</td>
</tr>
</tbody>
</table>
**Seppis Management: Enhancing Protocol Compliance in the Emergency Department**

<table>
<thead>
<tr>
<th>Authors</th>
<th>Study Description</th>
<th>Patients</th>
<th>Outcomes</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Im, Y., Kang, D., Ko, R.-E., Lee, Y. J., Lim, S. Y., Park, S., Na, S. J., Chung, C. R., Park, M. H., Oh, D. K., Lim, C.-M., Suh, G. Y., Lim, C.-M., Hong, S.-B., Oh, D. K., Suh, G. Y., Jeon, K., Ko, R.-E., Cho, Y.-J., &amp; Lee, Y. J., (2022)</td>
<td>Data was collected prospectively from a multicenter cohort consisting of septic cases in the emergency department to determine whether physicians should target different time-to-antibiotics thresholds for patients with sepsis or septic shock.</td>
<td>3035 patients from 19 different emergency rooms</td>
<td>Patients who received antibiotics within the first hour of diagnosis experienced an improvement in their septic state, leading to a reduced risk of developing septic shock. However, those who received antibiotics after three hours showed an increased risk of mortality.</td>
<td>Level II (Dang et al., 2021)</td>
</tr>
<tr>
<td>Kabil, G., Frost, S. A., Hatcher, D., Shetty, A., Foster, J., &amp; McNally, S., (2022)</td>
<td>A systematic review, meta-analysis, and a narrative review. Examine how to effectively improve compliance with early fluid administration, alongside investigating non-interventional measures and any barriers that may influence fluid.</td>
<td>Researchers used various databases to search for relevant studies. Such databases included MEDLINE Ovid/PubMed, Ovid EMBASE, CINAHL, and Scopus.</td>
<td>The effectiveness of interventions was assessed through meta-analysis, while non-interventional measures were evaluated through narrative studies. The meta-analysis studies found a 47% improvement in compliance, while narrative studies showed a 48% compliance rate for early fluid administration with an average 24-minute reduction in time.</td>
<td>Level III (Dang et al., 2022)</td>
</tr>
<tr>
<td>Authors</td>
<td>Study Details</td>
<td>Findings</td>
<td>Evidence Level</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
<td>----------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>Rababa, M., Bani Hamad, D., &amp; Hayajneh, A. A., (2022)</td>
<td>Assess the effectiveness of branching simulations to improve sepsis assessment and management, as well as nursing processes, knowledge, attitudes, and decision-making. This was an experimental study.</td>
<td>A total of 70 nurses with at least one year of experience working in an emergency room at a university hospital. After the branching simulations intervention, nursing practices, decision-making, and knowledge showed significant improvement compared to the control group.</td>
<td>Level I (Dang et al., 2022)</td>
<td></td>
</tr>
<tr>
<td>Sungkar, Y., Considine, J., &amp; Hutchinson, A</td>
<td>Systematic literature review of longitudinal repeated-measures cohort study designs.</td>
<td>Twenty-four studies were included for analysis. After implementing the sepsis bundle or guidelines, the emergency department observed a decrease in the time taken to administer antibiotics (according to 22 out of 24 studies examined). Nearly all patients who received antibiotics within the first hour of sepsis identification showed significant improvement. Moreover, the implementation of sepsis guidelines led to an improvement in the collection of lactate blood draws. Lactate blood draw ranges increased from 46% to 100%.</td>
<td>Level III (Dang et al., 2022)</td>
<td></td>
</tr>
</tbody>
</table>
Appendix C

Plan, Do, Study, Act (PDSA) Cycle

**PLAN**
- Collaborate with Hospital A’s leadership team to identify gaps between sepsis management protocol and practice within the emergency department.
- Create a specific aim statement.
- Create a PICOT question.
- Construct a survey questionnaire.

**DO**
- Assess the current sepsis bundle and compliance in the ED microsystem.
- Utilize the 5 P assessment tool in order to conduct a Root Cause Analysis (RCA).
- Administer passive questionnaire to nurses.
- Explore the organization’s Strengths, Weakness, Opportunities, and Threats (S.W.O.T.).
- Present recommendations based on evidence to the leadership team on December 4, 2023.

**ACT**
- Increase sepsis training regularity. Interactive “simulation style” training may bring more attentiveness than online training. Post training questionnaire with closed-ended questions to thoroughly assess the learning and competency of nurses.
- Establish an ED sepsis policy to help standardize practice.
- Hand out Badge Reel Care cards that include the sepsis policy and escalation processes.
- Continuous IV training.

**STUDY**
- Analyze Hospital A’s current sepsis compliance of the last 2023 quarter.
- Review national evidence-based practice on sepsis bundle protocol in the ED.
- Analyze data collected from survey questionnaires.
- Review post-intervention data once the quality improvement project is complete.
Appendix D

Root Cause Analysis

Root Cause Analysis: Fishbone Diagram
Appendix E

Strengths, Weaknesses, Threats, Opportunities (SWOT) analysis

**STRENGTHS**
- Established evidence-based sepsis bundle.
- Online education modules.
- Nursing staff ability to place standing orders when SIRS criteria are met.

**WEAKNESSES**
- Discrepancy with frequency of annual training.
- Sepsis protocol not tailored to the ED.
- Minimal use of Sepsis Champion.
- Lack of collaboration and standardized follow-up for noncompliance.

**THREATS**
- Time and cost for education, training and sepsis resources.
- Staff reluctance to conduct change.
- Unpredictable ED workflow and patient numbers.
- Current EPIC charting.

**OPPORTUNITIES**
- Reduced risks of sepsis.
- Increased protocol compliance.
- Reduced length of stay, readmission rates, and associated financial burden.
- Improvement in nursing skills, education, and critical thinking.
- Increased protocol compliance.
Appendix F

Pre-Intervention Survey Questionnaire

Survey Questionnaire

1. What is your protocol when treating a patient in the emergency room who is identified with sepsis?

2. How do you prioritize the treatments listed above? Is there a timeline?

3. What barriers prevent you from meeting sepsis bundle timelines?

4. What is your escalation process if you have questions or concerns regarding the sepsis treatment protocol?
5. When compliance with the sepsis protocol bundle is not met, what type of debrief or remedial training, if any, is conducted?

6. How often do you attend sepsis training?

7. How often do you place the standard orders for SIRS?

8. Do you wait for the doctor to submit the orderset before initiating the sepsis protocol?

9. What changes do you feel can be made to sepsis protocol in order to improve patient outcomes?

THANK YOU FOR YOUR TIME! ♡ USF Nursing Students!
Appendix G

<table>
<thead>
<tr>
<th>Cost-Benefit Analysis Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials and Labor</td>
</tr>
<tr>
<td>----------------------------</td>
</tr>
<tr>
<td>Year One</td>
</tr>
<tr>
<td>-----------------------------</td>
</tr>
<tr>
<td>Ultrasound Guided IV Training ($2,400 x 9 ED RNs)</td>
</tr>
<tr>
<td>Sepsis Badge Reel Cards ($7 x 115 RNs)</td>
</tr>
<tr>
<td>Sepsis Bundle Training ($90/hr x 115 ED RNs x 2)</td>
</tr>
<tr>
<td>Benefits</td>
</tr>
<tr>
<td>Benefits based on the average U.S. national yearly costs for septic patients, and related complications, times 15 patients at Hospital A’s Emergency Department.</td>
</tr>
<tr>
<td>Net Benefits</td>
</tr>
<tr>
<td>$966,195</td>
</tr>
<tr>
<td>Benefit-Cost Ratio</td>
</tr>
<tr>
<td>15.1</td>
</tr>
</tbody>
</table>

Cost Estimated For Ultrasound Guided IV Training
- **IV training:** $2,400
- **Train 3 RNs/shift:** 9 nurses
- **$2,400 x 9 = $21,600**

Cost Estimated For Sepsis Badge Cards
- **Price of cards:** $7
- **ED RN staff:** 115
- **$7 x 115 = $805/year**

Cost Estimated for Sepsis Bundle Training (2x/year)
- **ED RN wage at Hospital A:** $90 x 2hrs of training = $180
- **Frequency 2x/year:** $180 x 2 = $360/year
- **Staff:** 115 ED RNs
- **$360 x 115 = $41,400/year**

**Total Estimated Cost:** $63,805/year

**Compared To:** Average Yearly Cost of Septic Care/Complications for 15 patients: **$1,030,000 per year.**
## Appendix H

### Gantt Chart

<table>
<thead>
<tr>
<th>TASK TITLE</th>
<th>START DATE</th>
<th>DUE DATE</th>
<th>AUGUST</th>
<th>SEPTEMBER</th>
<th>OCTOBER</th>
<th>NOVEMBER</th>
<th>DECEMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>WEEK</td>
<td>WEEK</td>
<td>WEEK</td>
<td>WEEK</td>
<td>WEEK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Conception</td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Define Project</td>
<td>8/25/23</td>
<td>8/25/23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop AIM/Draft Proposal</td>
<td>8/25/23</td>
<td>9/7/23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Literature Review</td>
<td>8/25/23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sepsis Steering Committee Meeting</td>
<td>9/12/23</td>
<td>9/12/23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify Stakeholders</td>
<td>8/25/23</td>
<td>9/12/23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Planning</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microsystem Assessment/On-site Walkthrough</td>
<td>9/12/23</td>
<td>9/12/23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop Questionnaire</td>
<td>8/25/23</td>
<td>9/13/23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Proposal to Leadership</td>
<td>9/13/23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Implementation</td>
<td></td>
<td></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Questionnaire Administration</td>
<td>9/13/23</td>
<td>10/29/23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microsystem Observation</td>
<td>9/12/23</td>
<td>10/29/23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Evaluation and Synthesis</td>
<td></td>
<td></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project recommendation to leadership</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>